

WHAT IS CLAIMED IS:

1. Filament-wound tank apparatus comprising:

a tank;

5 a wound filament structure extending externally around and reinforcing said tank, said wound filament structure having an outer surface;

 at least one single layer, open weave reinforcing patch disposed between said tank and said outer surface of said wound filament structure
10 and being secured to said wound filament structure; and

 an opening extending into the interior of said tank from said outer surface of said wound filament structure and through said at least one single layer, open weave reinforcing patch.

15 2. The filament-wound tank apparatus of Claim 1 wherein:
 said tank is a water heater storage tank.

 3. The filament-wound tank apparatus of Claim 1 wherein:
 said tank is of a non-metallic construction.

20 4. The filament-wound tank apparatus of Claim 1 wherein:
 said tank is of a plastic construction.

 5. The filament-wound tank apparatus of Claim 1 wherein:
25 said tank is of a blow-molded plastic construction.

6. The filament-wound tank apparatus of Claim 1 wherein:
said at least one single layer, open weave reinforcing patch is
imbedded in said wound filament structure.

5 7. The filament-wound tank apparatus of Claim 1 wherein:
said wound filament structure is defined by a multi-layer filament
winding impregnated with a cured resin material, and
said at least one single layer, open weave reinforcing patch is
impregnated with, and adhered to said wound filament structure by, said
10 cured resin material.

8. The filament-wound tank apparatus of Claim 1 wherein:
said at least one single layer, open weave reinforcing patch is a
stacked series of single layer, open weave reinforcing patches
15 interdigitated with layers of said wound filament structure, said opening
extending through each patch.

9. The filament-wound tank apparatus of Claim 8 wherein:
each of said single layer, open weave reinforcing patches has a pre-
20 formed hole extending therethrough and through which said opening
passes, said pre-formed hole having a reinforced periphery.

10. The filament-wound tank apparatus of Claim 1 wherein:
said at least one single layer, open weave reinforcing patch has a
25 pre-formed hole therein through which said opening extends.

11. The filament-wound tank apparatus of Claim 10 wherein:
said at least one single layer, open weave reinforcing patch is
imbedded in said wound filament structure.

5 12. The filament-wound tank apparatus of Claim 10 wherein:
said pre-formed hole has a reinforced periphery.

13. The filament-wound tank apparatus of Claim 1 wherein:
said tank has a generally cylindrical configuration with a side wall
10 portion, and
said opening extends through said side wall portion.

14. The filament-wound tank apparatus of Claim 1 further
comprising:
15 a structure sealingly extending through said opening into said tank.

15. A water heater comprising:

a tank adapted to hold a quantity of water to be heated;

a wound filament structure extending externally around and reinforcing said tank, said wound filament structure having an outer
5 surface;

at least one single layer, open weave reinforcing patch disposed between said tank and said outer surface of said wound filament structure and being secured to said wound filament structure;

an opening extending into the interior of said tank from said outer
10 surface of said wound filament structure and through said at least one single layer, open weave reinforcing patch;

heating apparatus for heating water in said tank;

a jacket structure extending outwardly around said wound filament structure and forming therebetween a cavity; and

15 insulation disposed within said cavity.

16. The water heater of Claim 15 wherein:

said water heater is an electric water heater, and

said heating apparatus includes an electric heating element sealingly
20 extending through said opening into the interior of said tank.

17. The water heater of Claim 15 wherein:

said tank is of a non-metallic construction.

25 18. The water heater of Claims 15 wherein:

said tank is of a plastic construction.

19. The water heater of Claim 15 wherein:
said tank is of a blow-molded plastic construction.

20. The water heater of Claim 15 wherein:

5 said at least one single layer, open weave reinforcing patch is
imbedded in said wound filament structure.

21. The water heater of Claim 15 wherein:

10 said wound filament structure is defined by a multi-layer filament
winding impregnated with a cured resin material, and

 said at least one single layer, open weave reinforcing patch is
impregnated with, and adhered to said wound filament structure by, said
cured resin material.

15 22. The water heater of Claim 15 wherein:

 said at least one single layer, open weave reinforcing patch is a
stacked series of single layer, open weave reinforcing patches
interdigitated with layers of said wound filament structure, said opening
extending through each patch.

20 23. The water heater of Claim 22 wherein:

 each of said single layer, open weave reinforcing patches has a pre-
formed hole extending therethrough and through which said opening
passes, said pre-formed hole having a reinforced periphery.

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24. The water heater of Claim 15 wherein:

said tank has a generally cylindrical configuration with a side wall portion, and

said opening extends through said side wall portion.

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25. The water heater of Claim 15 wherein:

said at least one single layer, open weave reinforcing patch has a pre-formed hole therein through which said opening extends.

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26. The water heater of Claim 27 wherein:

said preformed hole has a reinforced periphery.

27. The water heater of Claim 15 further comprising:

a structure sealingly extending through said opening into said tank.

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28. Tank apparatus comprising:

a filament-based wall structure;

a single layer, open weave reinforcing patch secured to said wall structure; and

5 an opening extending into the interior of said tank apparatus through said wall structure and said reinforcing patch.

29. The tank apparatus of Claim 28 wherein:

said tank apparatus is a water heater storage tank.

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30. The tank apparatus of Claim 28 further comprising:

a structure sealingly extending through said opening into the interior of said tank apparatus.

15 31. The tank apparatus of Claim 28 wherein:

said reinforcing patch is imbedded in said filament-based wall structure.

32. The tank apparatus of Claim 28 wherein:

20 said filament-based wall structure has an interior surface defining the interior surface of said tank apparatus.

33. The tank apparatus of Claim 28 wherein:

said tank apparatus further comprises an inner tank body
25 reinforcingly enveloped by said filament-based wall structure.

34. The tank apparatus of Claim 28 wherein:

said wall structure and said reinforcing patch are intersecured by a cured resin material portion of said wall structure.

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35. The tank apparatus of Claim 28 wherein:

said wall structure comprises a filament winding material impregnated with a cured resin material.

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36. The tank apparatus of Claim 28 wherein:

said wall structure comprises chopped fiber material impregnated with a cured resin material.

37. The tank apparatus of Claim 28 wherein:

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said reinforcing patch has a pre-formed hole therein through which said opening extends.

38. The tank apparatus of Claim 37 wherein:

said pre-formed hole has a reinforced periphery.

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39. A water heater comprising:

tank apparatus for storing a quantity of water to be heated, said tank apparatus including a filament-based wall-structure, a single layer, open weave reinforcing patch secured to said wall structure, and an opening extending into the interior of said tank apparatus through said wall structure and said reinforcing patch;

heating apparatus for heating water in said tank apparatus;

a jacket structure extending outwardly around said tank apparatus and forming therebetween a cavity; and

insulation disposed within said cavity.

40. The water heater of Claim 39 further comprising:

a structure sealingly extending through said opening into the interior of said tank apparatus.

41. The water heater of Claim 39 wherein:

said reinforcing patch is imbedded in said filament-based wall structure.

42. The water heater of Claim 39 wherein:

said filament-based wall structure has an interior surface defining the interior surface of said tank apparatus.

43. The water heater of Claim 39 wherein:

said tank apparatus further comprises an inner tank body reinforcingly enveloped by said filament-based wall structure.

44. The water heater of Claim 39 wherein:

said wall structure and said reinforcing patch are intersecured by a cured resin material portion of said wall structure.

5 45. The water heater of Claim 39 wherein:

said wall structure comprises a filament winding material impregnated with a cured resin material.

46. The water heater of Claim 39 wherein:

10 said wall structure comprises chopped fiber material impregnated with a cured resin material.

48. The water heater of Claim 39 wherein:

15 said reinforcing patch has a pre-formed hole therein through which said opening passes.

49. The water heater of Claim 48 wherein:

said pre-formed hole has a reinforced periphery.